

JES Systematics for e+jets Cross Section Measurement

JES Systematics affect the following values:

1. Jet ID efficiency
2. MET cut efficiency
3. Berends Scaling
4. Scaling Biases



JES systematics on Jet ID efficiency

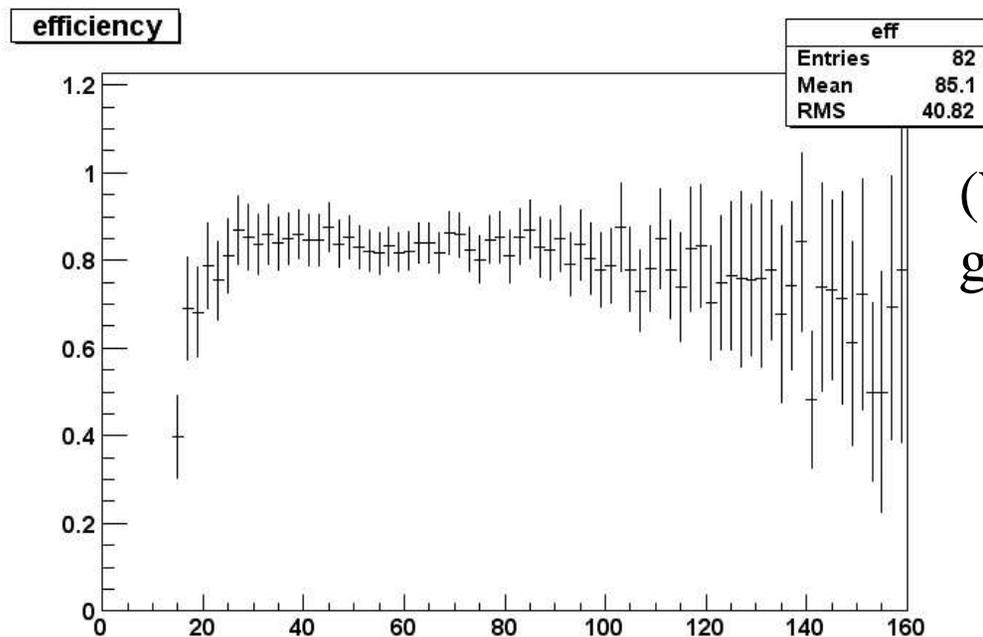
Obtain jet ID efficiency from data:

- sample: JES group p13.05 jet skim data

- Selection:

Jet ID: top group new jet ID, $ET > 15$, $|\eta| < 2.0$

Two jets back-to-back in phi. ($\pi - 0.1 < \Delta\phi < \pi + 0.1$)



(Working on the jet ID efficiency change given correction factor uncertainties.)

with standard correction factor



JES systematics from MC

- sample: p13.05 ttbar→e+jets MC sample
- Electron cuts:
 - Standard EMID in top_analyze, track match, $p_T > 20$
 - CC electron: $|\text{deta}| < 1.1$
 - # of EM candidates == 1
- jet cuts:
 - top group new jet ID, $p_T > 15$, $|\text{deta}| < 2.0$
 - # of jets ≥ 4
- $\text{mj_met} > 20$
- $\text{EJets_dphi_mete} > 0.5$

1. use JES correction parameter C
2. use $(C + \sqrt{\text{dC_sys}^2 + \text{dC_stat}^2})$
3. use $(C - \sqrt{\text{dC_sys}^2 + \text{dC_stat}^2})$



Jet ID & MET Cut Efficiency from MC

new result with jetcorr v04-01-00

correction scheme	1	2	5
Total Number of Events	21000	21000	21000
EM cuts	9223(43.92%)	9223(43.92%)	9223(43.92%)
jet cuts	3867(18.41%)	4091(19.48%)	3607(17.18%)
MET	3403(16.20%)	3589(17.09%)	3172(15.10%)
EJets_dphi_mete	3007(14.32%)	3175(15.12%)	2803(13.35%)
efficiency change		+5.59%	-6.77%



JES Systematics on Berends Scaling

W+jets sample selection:

- sample: etrack stream p13.05
- top_analyze: v00-02-12
- trigger: EM_HI_SH
- EM: standard EM ID, CC electron($|\text{deta}| < 1.1$), # of electrons == 1
- mj_met > 20
- Jet: top group new jet ID, ET > 15, $|\text{eta}| < 2.0$

Method:

use three correction factors to correct jet energy,
and plot Berends scaling in each case.

Fit only the first 4 bins (# of jets = 0, 1, 2, 3)

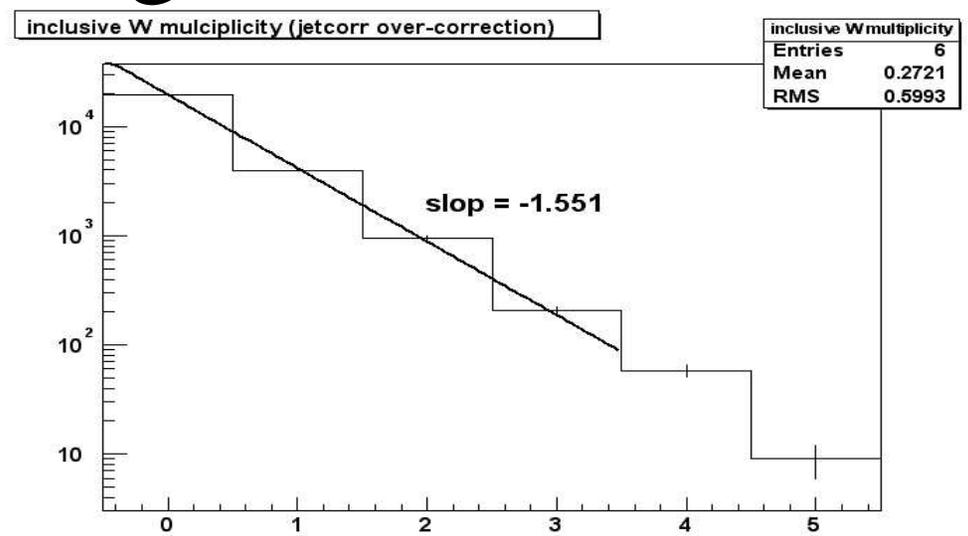
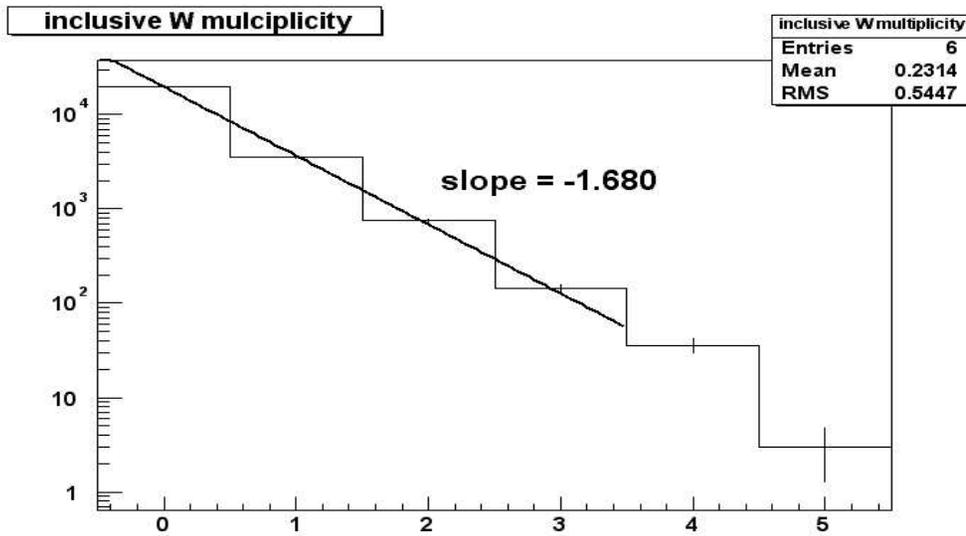
correction factor 1: use standard correction factor C

correction factor 2: use $C' = C + \sqrt{dC_{\text{sys}}^2 + dC_{\text{stat}}^2}$

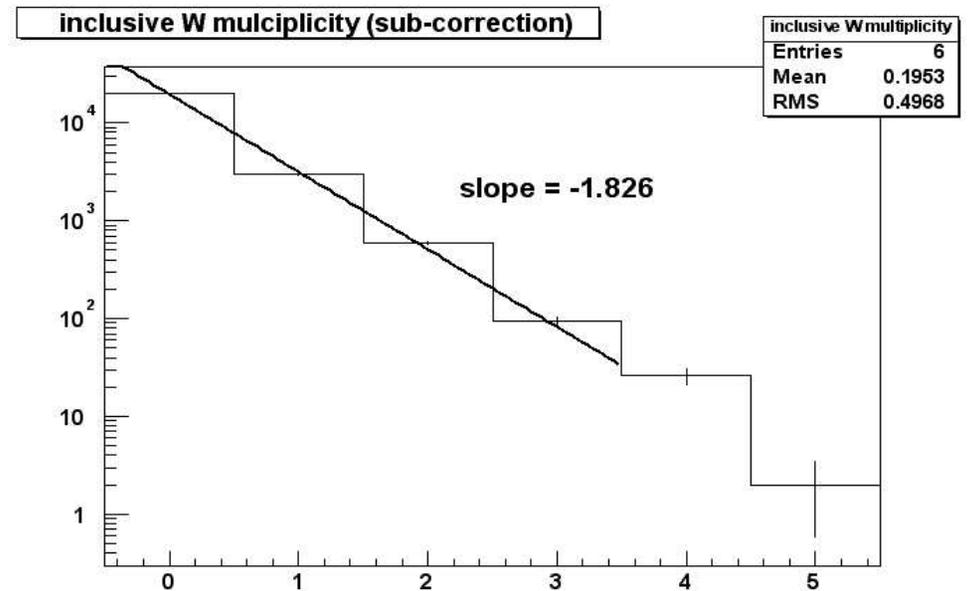
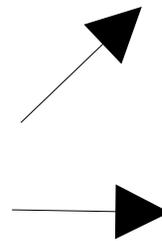
correction factor 3: use $C' = C - \sqrt{dC_{\text{sys}}^2 + dC_{\text{stat}}^2}$



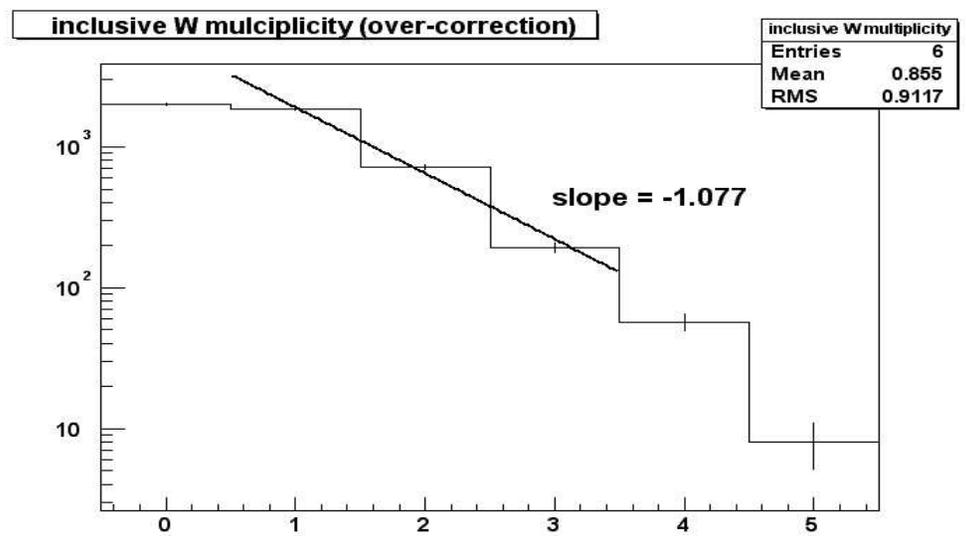
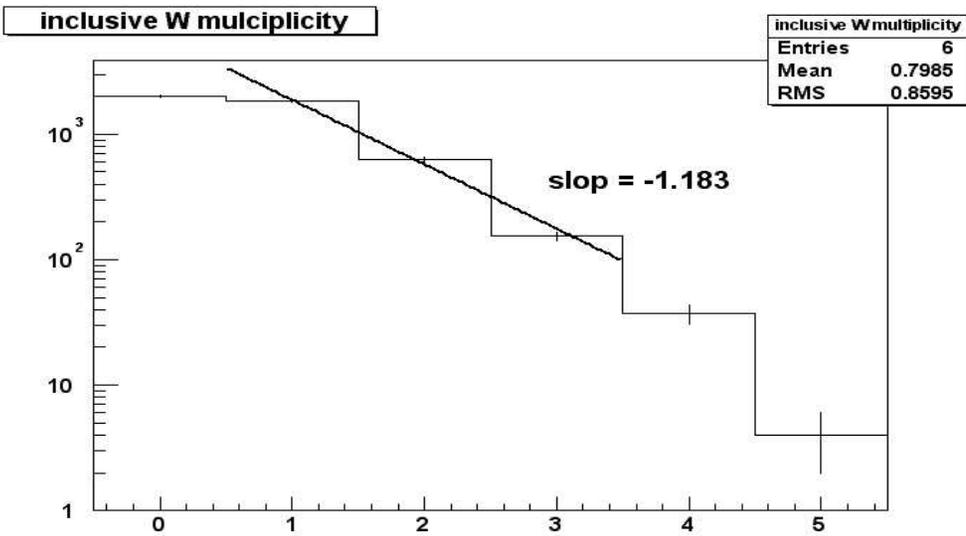
Berends Scaling Results



correction factor	slope change
1	0
2	+7.68%
3	-8.69%



W+jets multiplicity with EM15_2JT15



correction factor	slope change
1	0
2	+8.96%
3	-11.83%

